**SECTION 2. What is the situation of gastro-intestinal parasites in western Canada?**

Before 2013, there was little information about the types of gastrointestinal (GI) parasites affecting western Canadian sheep and about the level of anthelmintic resistance (link to section 4).

Since 2014, the University of Calgary Veterinary Medicine and the University Of Saskatchewan Western College Of Veterinary Medicine have conducted research projects to identify the different GI parasites affecting western Canadian sheep flocks and the degree of anthelmintic resistance of these parasites. Producers from British Columbia, Alberta, Saskatchewan and Manitoba are participating in the study.

**Our research indicates that the fecal egg counts are variable, and that the results need to be interpreted with caution**

We determined the parasite infection intensities by performing fecal egg counts (FEC) on pooled fecal samples from about 20 ewes, sent by producers from British Columbia, Alberta, Saskatchewan and Manitoba. Results are expressed in eggs per gram (epg) and are shown in Figure 1.

**Figure 1 Legend: Fecal egg count (FEC) pretreatment of ewes in farms in western Canada. Each column represents the FEC of a pooled sample of 20 ewes on 1 farm (2014-2018)**

The number of epg is an indication of the number of adult worms in the gut of the sheep. The following cut-off points are often used for interpretation:

Low: less than 500 epg

Moderate: 500 to 1000 epg

Severe: higher than 1000 epg

However, interpretation of FEC is not straightforward as it depends on the age of the animal, the type of parasite, the season and the level of pasture infection. Results of the FEC should be discussed with your veterinarian.

**Identifying species is important to understand the parasite situation. The current results of our research indicate that the Barber’s pole worm is the most common GI parasite present in western Canada.**

We analysed the parasite species present in the fecal samples of sheep from the study flocks, using the Nemabiome, a molecular technique recently developed at University of Calgary. *Haemonchus contortus* (barber’s pole worm) was identified as being the most prevalent species. *Teladorsagia circumcincta* (the brown stomach worm) and *Trichostrongylus colubriformis* are the second and third most common species of GI parasite in western Canadian flocks. See Figure 2

Knowing which worm species is present greatly increases the ability of a producer to know what infection signs to look for and to develop control strategies that will target the most prevalent species.

**Figure 2 Legend: Nematode species prevalence survey in western Canada**

**Commonly used dewormers such as ivermectin, fenbendazole and albendazole are often not effective in western Canada**

Until recently, parasite control in Canada largely depended on the use on just two dewormer classes: ivermectin (Ivomec®, Ivermectin drench® and Noromectin®) and benzimidazoles (SafeGuard® and Valbazen®). In addition to identifying the species present, the western Canadian sheep parasite study has provided much needed insights into how well these two most commonly used dewormer classes are effective in western Canadian flocks. Results of fecal egg count reduction tests (FECRT) from the study indicate that current dewormer treatments are often not effective. Of the flocks treated with ivermectin or benzimidazole drugs treatments were not fully effective in 89% and 85% of flocks respectively (a reduction in fecal egg counts of 95% or more is the definition of fully effective).

Moreover, the study also looked at the effectiveness of ivermectin and benzimidazole dewormer treatments against each of the different roundworm species. For instance, if we look at figures 3 and 4 below, we can see the proportions of the different roundworm species present in each flock before and after treatment with the different classes of dewormer (samples taken from FECRT study)

In the case of benzimidazoles (Figure 3), the barber’s pole worm *Haemonchus contortus* (in red) is present in all samples “before treatment” (first column for each farm) and in all samples “after treatment” (second column for each farm). This means that this roundworm species is surviving the treatment with benzimidazole dewormers.

**Figure 3 Legend: Species composition before and after treatment with benzimidazoles for each farm. Top black bars are Eggs per gram. Bottom columns are species composition. Every two columns are a different farm, pre and post treatment, respectively.**

We see a similar pattern in the case of ivermectin (Figure 4).

**Figure 4 Legend: Species composition before and after treatment with ivermectin for each farm. Every two columns are a different farm, first column shows species composition before ivermectin treatment, second column shows species composition after ivermectin treatment.**

Since 2017, 2 new dewormers (Flukiver® and Startect® have been approved for use in Canada (link to section 3)

**In conclusion, monitoring fecal egg counts and identifying parasite species is a key to roundworm control programs**

Only a few years ago the blood feeding barber’s pole worm *Haemonchus contortus* was not considered a major problem in western Canada: it is now shown to be most prevalent roundworm parasite in the region. The reasons for this are not entirely understood but likely to be a combination of emerging dewormer resistance, climate change and management changes. Also, just a few years ago the assumption was that dewormers worked well and resistance was not a problem in the region. All this emphasizes that producers need to be more aware of the risk of roundworm parasites, the need for monitoring and the need for evidence-based roundworm control programs.

(Link to section 3 )